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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/046,633	01/14/2002	Alexei Gorokhov	NL 010037	4799

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PHILIPS INTELLECTUAL PROPERTY & STANDARDS
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EXAMINER	
FILE, ERIN M	

ART UNIT	PAPER NUMBER
2611	

DATE MAILED: 08/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/046,633	GOROKHOV ET AL.	
	Examiner	Art Unit	
	Erin M. File	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-9,11,12,14,15,17,18,20,21,23,24 and 26-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) ____ is/are allowed.

6)☒ Claim(s) *1,2,4-9,11,12,14,15,17,18,20,21,23,24 and 26-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claims 14, 15, 17, 18, 23, 24, and 26-29 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 23, 24, 26-29 are directed to a signal. Claims that recite nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or the strength of a magnetic field, define energy or magnetism, per se, and as such are nonstatutory natural phenomena. O'Reilly, 56 U.S. (15 How.) at 112-14. Moreover, it does not appear that a claim reciting a signal encoded with functional descriptive material falls within any of the categories of patentable subject matter set forth in § 101. First, a claimed signal is clearly not a "process" under § 101 because it is not a series of steps. The other three § 101 classes of machine, compositions of matter and manufactures "relate to structural entities and can be grouped as 'product' claims in order to contrast them with process claims." 1 D. Chisum, Patents § 1.02 (1994). Regarding claims 14, 15, 17, 18 although the preamble of the claims refers to a mapper/demapper, the claims body is directed to a structure of a signal and are therefore also non-statutory.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1, 2, 4-9, 11, 12, 14, 15, 17, 18, 20, 21, 23, 24 and 26-29 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. A new limitation introduced into independent claims 1, 8, 11, 14, 17, 20, 23, of a variable signal constellation. There is no written description of a variable signal constellation in the specification.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 14, 15, 17, 18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 14 recites a mapper in the preamble, however, there is no structure for a mapper recited in the claim preamble. Claim 17 recites a demapper, however, there is no structure for a demapper as recited in the claim preamble.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1, 4-8, 11, 14, 17, 20, 23, 26-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brink in view of Alamouti.

Claims 1, 8, 11, 14, 17, 20, 23, Brink discloses a digital transmission system and method (title) in which a multilevel signal is transmitted (abstract). The transmitter, as shown in figure 4, comprises an M:1 mapper (8), in which M bits are grouped together and mapped onto a complex signal constellation (col. 7, lines 4, 5). The receiver, also shown in figure 4, comprises a demapper (10) for demapping the received multilevel signal according to the signal constellation, wherein the signal constellation comprises a number of signal points with corresponding labels (fig. 5-7). Brink fails to disclose a variable constellation mapping of 2^m signal points with labels of length m, where $D_a > D_f$, with D_a being the minimum of the Euclidean distances between all pairs of signal points whose corresponding labels differ in a single position, and with D_f being the minimum of the Euclidean distances between all pairs of signal points. However, Alamouti discloses a signal constellation of 16 (2^4) signal points of 4 bit length labels. Further the limitation of a variable signal constellation is interpreted here as being one of several constellation, as a signal constellation diagram cannot be expressed as a variable

diagram. Alamouti, being one of several possible signal constellations, meets this limitation. The following is a mathematical explanation of how the constellation disclosed by Alamouti meets the limitation $D_a > D_f$, with D_a the minimum Euclidean distance between signal points whose corresponding labels differ by one position and D_f the minimum distance between all pairs of signal points follows:

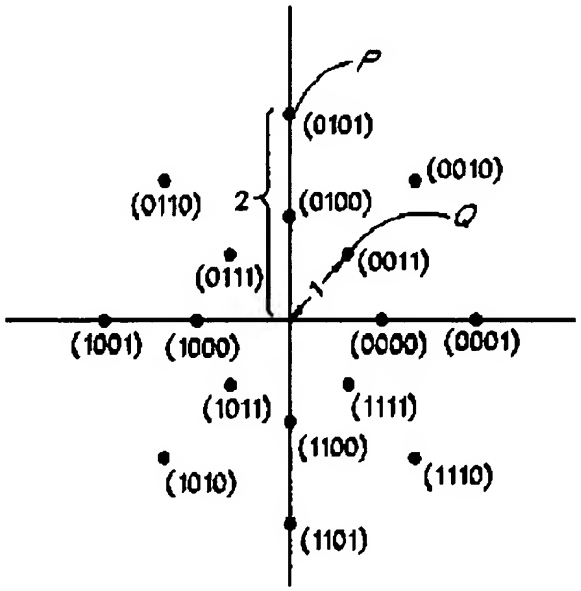


figure 1B from Alamouti reference

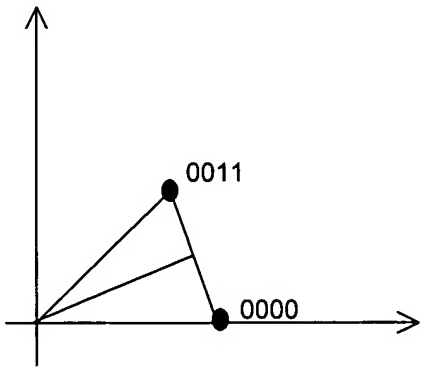
The minimum Euclidean distance between all pairs of signals whose corresponding labels differ in a single position. The following is a list of all adjacent points which vary in one position, it is assumed that non adjacent points which vary by one position will have a greater distance and therefore cannot be the minimum distance:

Constellation Point 1	Constelllation Point 2	Distance
0010	0011	1

0110	0111	1
1001	1000	1
0100	0101	1
1011	1010	1
0000	0001	1
1111	1110	1
0010	0011	1
1100	1101	1

Visual inspection of above reference figure 1B shows that the radius from origin to inner circle is 1 and the radius from origin to outer circle is 2, therefore the distance between two points, one on the outer circle and one on the inner circle, if those points exists on the same radial line is 1. All of the points listed above meet this criteria and the minimum distance D_a is 1.

The minimum Euclidean distance between all signal points, D_f, is the minimum distance between any two signal points in the constellation. To prove that $D_a > D_f$ it is only necessary to prove that any two points have a distance (D_f) that is less than D_a. Examine points (0011) and (0000), diagram of these points in the constellation diagram is shown here for clarity.



Reproduction of two points in figure 1B

The distance between origin (hereafter referred to as O) and 0011 is equal to 1, as is the distance between the origin and 0000. The angle between (O, 0011) and (O,0000) equals 45 degrees. To find the distance between (0011) and (0000), a line is drawn from the origin to the midpoint of the line connecting two said points. Then using basic geometry, it can be determined sin (22.5) = x/1, we get x=0.383, and 2x, the distance between (0011) and (0000) is 0.765, which is less than 1.

The use of a constellation mapping in which the adjacent symbols vary by more than one position reduces the bit error rate. Brink's invention discloses that it stores and uses multiple constellation mappings (col. 6, lines 18-25) that lead to the least number of errors, therefore it would be obvious to one skilled in the art at the time of invention to use Alamouti's signal constellation in Brink's invention.

Claims 4, 26, the constellation diagram as disclosed by Alamouti meets the definition of a circular 16 QAM (Alamouti, 1B, Wikipedia, circular QAM).

Claims 5, 6, 27, 28, although the limitation of a 64 or 256 QAM is not explicitly disclosed by Brink or Alamouti, it is well known to those skilled in the art that 64 and 256 QAM constellations have the benefit of increased data transmission over 16 QAM constellations (Wikipedia, QAM Overview). Because of the obvious advantage increased data transmission, it would be obvious to one skilled in the art at the time of invention to use 64 or 256 QAM in place of 16 QAM.

Claims 7, 29, although the limitation of a 8-PSK is not explicitly disclosed by Brink or Alamouti, it is well known to those skilled in the art that 8-PSK is generally used instead

of 8 QAM because 8-QAM presents problems in dividing an odd number of bits between 2 carriers (Wikipedia, rectangular QAM, par. 2). Further, the use of an 8 bit instead of a 16 bit constellation allows for more accurate data transmission (Wikipedia, QAM Overview). Because of these advantages it would be obvious to one skilled in the art at the time of invention to use an 8 PSK constellation in place of the circular 16 QAM as disclosed by Alamouti at the time of invention.

Claim Objections

9. Claims 1, 8, 11, 14, 17, 20, 23 are objected to because of the following informalities:

Claim 1, insert "following" before "criteria" in line 6.

Claim 8, insert "following" before "criteria" in line 4.

Claim 11, insert "following" before "criteria" in line 4.

Claim 14, insert "following" before "criteria" in line 3.

Claim 17, insert "following" before "criteria" in line 3.

Claim 20, insert "following" before "criteria" in line 6.

Claim 23, insert "following" before "criteria" in line 4.

Appropriate correction is required.

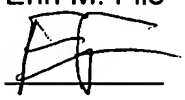
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erin M. File whose telephone number is (571)272-6040. The examiner can normally be reached on M-F 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Erin M. File



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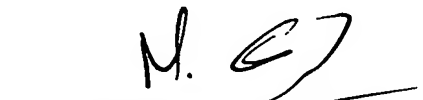

MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER